



07/06/00

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SACRAMENTO OFFICE
(916) 961 1530ATTORNEY DOCKET: ROTH #12BOX PATENT APPLICATION
Asst. Commissioner for Patents
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor/Owner: STEVEN A. ROTHFor: APPARATUS FOR STIFFENING A HANGER ROD

Enclosed are:

- ☒ 2 sheet(s) of formal drawings.
 - ☐ An assignment of the invention to
 - ☐ Form PTO-1595 Recordation Form Cover Sheet.
 - ☐ A certified copy of application.
 - ☐ Specimens (2 minimum)
 - ☒ A Verified Statement to establish small entity status under CFR 1.9 and 37 CFR 1.27.
 - ☒ Declaration/Statement and Power of Attorney.
 - ☒ Specification and Claims.
 - ☒ 2 copies of prior art references listed on the enclosed PTO 1449 Form.
- The filing fee has been calculated as shown below:

FOR:	(Col. 1)	(Col. 2)	SMALL ENTITY		OTHER THAN A SMALL ENTITY	
	No. Filed	No. Extra	Rate	Fee	Rate	Fee
BASIC FEE			\$345.00		\$	
TOTAL CLAIMS	9-20*	-0-	x9=	\$	x18=	\$
INDEP. CLAIMS	1- 3*	-0-	x39=	\$	x78=	\$
<input type="checkbox"/> MULTIPLE DEP. CLAIM PRESENTED			x130=	\$	x260=	\$
	Assignment			\$		\$

*If the difference in Col 1.

is less than zero, enter "0" **TOTAL** \$ 345.00 **TOTAL** \$

in Col 2.

- ☒ A check in the amount of \$345.00 to cover all the fees is enclosed.
- ☒ The Commissioner is hereby authorized to charge any additional required fees associated with this communication arising during the pending of this application, EXCEPT the issue fee, or credit any overpayment to Account No. 02-2273. A duplicate copy of this sheet is enclosed.
- ☒ Certificate of Mailing by Express Mail No. EJ325489407US in duplicate.
- ☒ Post Card.

Date: July 6, 2000
THOMAS R. LAMPE, Reg. No. 22,454

jc857 U.S. PTO

09/610510



Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	Male	Female		
Marital status	Married	Single		
Education	High school	College		
Occupation	Manager	Worker		
Income	\$10,000	\$20,000		
Health status	Good	Poor		
Smoking status	Smoker	Non-smoker		
Alcohol consumption	Regular	Occasional		
Exercise frequency	Weekly	Monthly		
Stress level	High	Low		
Family size	2	3		
Home ownership	Owner	Renter		
Commute time	30 min	45 min		
Neighborhood safety	Safe	Unsafe		
Public transportation	Used	Not used		
Crime rate	Low	High		
Property taxes	\$500	\$1,000		
Quality of life	High	Low		
Life satisfaction	Very satisfied	Satisfied		
Healthcare access	Good	Poor		
Environmental quality	High	Low		
Community involvement	Active	Passive		
Local government	Effective	Ineffective		
Public services	Good	Poor		
Infrastructure	Well-maintained	Poorly-maintained		
Local economy	Strong	Weak		
Job opportunities	High	Low		
Unemployment rate	Low	High		
Local culture	Diverse	Homogeneous		
Local history	Rich	Poor		
Local landmarks	Many	Few		
Local events	Frequent	Rare		
Local government	Transparent	Opaque		
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Local government	Transparent	Opaque		
Local government	Responsive	Unresponsive		
Local government	Accountable			

1

I acknowledge the duty to file, in this application or patent, notification of any change in the status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR §1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR: STEVEN A. ROTH

SIGNATURE OF INVENTOR: 

DATE: 7/03/00

APPARATUS FOR STIFFENING A HANGER ROD

5

TECHNICAL FIELD

004450 This invention relates to apparatus employed in the building construction industry and more particularly to stiffener apparatus for surrounding and stiffening a hanger rod employed to hold or support pipes, conduits or other components of a building from building structure.

BACKGROUND OF THE INVENTION

00445 Various types of assemblies or devices have been devised for stiffening hanger rods, for example, for seismic bracing purposes. Such devices are often, but not always, associated with multi-directional bracing for electrical conduit, cable trays and mechanical piping systems.

20 One common type of hanger rod stiffener assembly is that exemplified by the SC228 hanger rod stiffener assembly and the B22 channel combination made available by B-Line Systems, Inc. of Franklin Park, Illinois in which a clamp is disposed

inside the channel rod stiffener to capture the threaded hanger rod and stiffen it.

Another well known approach that is that exemplified by the SC-UB hanger rod stiffener assembly utilized with the B22 channel, also made available by B-Line Systems, Inc. wherein a U-bolt is connected to a two-hole plate by hex nuts, the threaded hanger rod being captured between the rounded portion of the U-bolt and the channel.

It is also known to use bolts similar to U-bolts but which are straight, rather than curved, at the closed end thereof, the straight closed end being orthogonal to the threaded legs of the bolt. Hanger rod slippage is a problem with this arrangement.

Prior art hanger rod stiffener assemblies or devices have certain inherent limitations. For example, they are often restricted as to size and the same assembly can not be used for both large and small diameter rods. Virtually all such devices must utilize channel or uni-strut material as the stiffener component per se. Channels can, once they get to be a certain length, also become structurally unstable.

It is also known to weld hanger rod to a stiffener. This is time consuming and expensive. Furthermore, such a connection is permanent and the stiffener is not removable from the rod once welded into place.

DISCLOSURE OF INVENTION

5 The present invention relates to rod stiffener apparatus which is characterized by its ease of use, reliability and versatility. The apparatus is readily usable to stiffen both large and small diameter rods; that is, one size of rod stiffener apparatus constructed in accordance with the teachings of the present invention accommodates itself to many different hanger rod sizes. In addition, stiffeners other than open channels may be employed. For example, pipes or square or other rectangular-shaped tubes may be utilized.

10 The stiffener apparatus of the present invention includes a clamp having two straight, double-ended, spaced, parallel first and second clamp segments threaded over at least portions of the lengths thereof and a third clamp segment integral with and extending between ends of the first and second clamp segments.

15 The apparatus also includes a plate defining spaced openings. Ends of the first and second clamp segments remote from the third clamp segment project through the spaced openings.

20 Nuts are threadedly engaged with the ends of the first and second clamp segments projecting through the spaced openings and connect the clamp to the plate.

An elongated stiffener member is disposed between the plate and the third clamp segment for engaging a hanger rod

extending parallel to the elongated stiffener member and
cooperable with the clamp to maintain the hanger rod in a
predetermined position relative to the elongated stiffener and
the clamp.

5 At least a portion of the third clamp segment is
straight, non-orthogonally disposed relative to the first and
second clamp segments and cooperable with the elongated stiffener
member to continuously exert lateral forces on the hanger rod
continuously urging the hanger rod to the predetermined position
10 when the hanger rod is clamped between the clamp and the
elongated stiffener member.

Other features, advantages, and objects of the present
invention will become apparent with reference to the following
description and accompanying drawings.

15 **BRIEF DESCRIPTION OF DRAWINGS**

Fig. 1 illustrates a threaded hanger rod being
stiffened by a prior art rod stiffener assembly and employed to
support a pipe holder;

20 Fig. 2 is an enlarged, cross-sectional view taken along
the line 2-2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2 but illustrating
another prior art hanger rod stiffener assembly;

Fig. 4 is a view similar to Figs. 2 and 3 but
illustrating an embodiment of apparatus constructed in accordance

with the teachings of the present invention being employed to stiffen a hanger rod;

Fig. 5 is a view similar to Fig. 4 but illustrating an alternative embodiment of the present invention;

5 Fig. 6A shows an arrangement similar to that of Fig. 4 but illustrates use of a tube having a rectangular cross-section as a stiffener member;

10 Figs. 6B and 6C show an arrangement similar to Fig. 4 but illustrating a round tubular stiffener member utilized to stiffen hanger rods of large and small diameter, respectively;

Fig. 7A shows an arrangement similar to that of Fig. 5 but illustrating use of a tubular, rectangular-shaped stiffener member;

15 Figs. 7B and 7C illustrate an arrangement similar to Fig. 5 but illustrating use of a circular-shaped stiffener member employed, respectively, with large and small diameter hanger rods;

20 Fig. 8A illustrates yet another alternative embodiment of the invention employing a differently shaped clamp and utilizing a rectangular-shaped tubular member as the stiffener member; and

Figs. 8B and 8C are similar to Fig. 8A but illustrate use of a cylindrically-shaped round tubular stiffener member employed to stiffen hanger rods of large and small diameter,

respectively.

MODES FOR CARRYING OUT THE INVENTION

Figs. 1 and 2 illustrate a typical prior art stiffener assembly utilized to stiffen a threaded hanger rod 10 supporting a pipe holder bracket or yoke 12.

The assembly includes an elongated stiffener member in the form of a channel 14 extending along hanger rod 10.

A plurality of U-bolts 16 have the free, threaded ends thereof passing through holes formed in plates 18 and secured in place relative thereto by nuts 20. When the nuts 20 are tightened, hanger rod 10 has front and rear clamping forces exerted thereon by U-bolts 16 and channel 14.

The prior art approach disclosed in Figs. 1 and 2 is employed for use with larger diameter hanger rods and cannot be used for smaller diameter rods due to the fact that the curvature of the U-bolt 16 limits the extent to which the channel 14 can approach the outer curved end of the U-bolt.

Fig. 3, on the other hand, illustrates a prior art arrangement typically employed to stiffen hanger rods of smaller diameter. In this arrangement, the hanger rod 10 is disposed within the confines of a channel 14. The hanger rod 10 is captured by a clamp element 22 rotatably connected to a threaded bolt 24 threadedly engaged with a plate 26, the latter also being disposed within channel 14. It will be appreciated that the

arrangement of Fig. 3 can be used only with holder rods of smaller diameter, and not with larger diameter rods.

In contrast, and as will be seen below, the apparatus of the present invention may be utilized to stiffen rods of both large and small diameter or cross-section.

Fig. 4 illustrates an embodiment of the present invention wherein a clamp 30 is associated with an elongated stiffener member in the form of channel 14. The clamp has two straight, double-ended, spaced, parallel clamp segments 32, 34 threaded over portions of the lengths thereof. A third clamp segment 36 is integral with and extends between ends of clamp segments 32, 34.

Plate 18 defines spaced openings (not shown) and the threaded free ends of the clamp segments 32, 34 pass therethrough. Nuts 20 are employed to connect the clamp 30 to the plate.

The elongated stiffener member 14 is disposed between the plate and the clamp segment 36 and engages hanger rod 10, the rod of course extending parallel to the elongated stiffener member. The stiffener member and the clamp cooperate to maintain the hanger rod in a predetermined, fixed position relative to the elongated stiffener and the clamp. In Fig. 4, that predetermined position is located mid-way between clamp segments 32, 34.

Clamp segment 36 includes inter-connected straight portions 38, 40. Straight portion 38 extends from and forms an obtuse angle with clamp segment 32. Straight portion 40 extends from and forms an obtuse angle with clamp segment 34. Straight portions 38, 40 define an obtuse angle therebetween and the predetermined position of the hanger rod is at the location the straight portions are inter-connected.

The straight portions 38, 40 exert generally opposed lateral forces on the hanger rod continuously ramping or urging the hanger rod to the predetermined location when the hanger rod is clamped between the clamp and the elongated stiffener member. It will be seen that the arrangement of Fig. 4 allows considerable movement between the elongated stiffener member and the closed end of the clamp so that various sizes of hanger rods can be accommodated and clamped.

Fig. 6A shows the arrangement of Fig. 4, only somewhat larger, and in Fig. 6A the stiffener member is a square tubular member 48 having a rectangular-shaped outer peripheral bearing surface bearing against plate 18 and the hanger rod.

Fig. 6B shows the arrangement of Fig. 4 except that the stiffener member is a cylindrical tube 50 having a round or circular-shaped outer bearing surface. Stiffener member 50 bears against plate 18 and rod 10, lateral forces exerted by straight portions 38, 40 maintaining the rod at their point of

intersection.

In Fig. 6C a smaller rod 10A is held by the arrangement shown in Fig. 6B. In this instance, the smaller diameter hanger rod 10A is maintained at the intersection between straight
5 portion 40 of clamp segment 36 and clamp segment 34.

In the Fig. 5 embodiment, the clamp 60 includes two straight, double-ended, spaced, parallel clamp segments 62, 64 and a clamp segment 66 connected thereto and extending therebetween. In this embodiment clamp segment 66 is straight
10 along the entire length thereof and forms an obtuse angle with clamp segment 64 and an acute angle with clamp segment 62. In this instance, the predetermined position occupied by the hanger rod 10 is at the intersection between clamp segment 66 and clamp segment 62, the inclined surface of the clamp segment 66
15 directing the hanger rod to that position by exerting ramping or camming forces on the hanger rod. Once in the corner defined by clamp segments 62, 66 and channel 14, the rod will stay there due to the continuous forces exerted thereon.

Fig. 7A shows clamp 60 employed in association with a
20 stiffener member 48 having a rectangular (square) shape. In Fig. 7B, the clamp 60 cooperates with plate 18 and round or tubular stiffener member 50 to maintain the hanger rod in position. Fig. 7C illustrates a position assumed by a hanger rod 10A of smaller diameter when clamped into position by this embodiment of the

invention.

Figs. 8A - 8C illustrate another approach wherein a clamp 70 has an intermediate clamp segment 72 comprised of two straight portions 74, 76.

5 Straight portion 76 is longer than straight portion 74; thus, the straight portions connect at a location closer to threaded clamp segment 80 than to threaded clamp segment 82.

10 In Fig. 8A, the clamp 70 cooperates with rectangular stiffener member 48 to position the hanger rod in a fixed predetermined location corresponding to the point of intersection of straight portions 72, 74.

 Fig. 8B is similar to Fig. 8A but illustrates a round tubular stiffener member 50 cooperable with the clamp to position the hanger rod.

15 Fig. 8C is similar to Fig. 8B. However, in this instance a hanger rod of smaller diameter is positioned at the intersection of straight portion 76 and clamp segment 82.

The Invention Claimed Is:

1. Stiffener apparatus for surrounding and stiffening a hanger rod, said stiffener apparatus comprising, in combination:

a clamp having two straight, double-ended, spaced, parallel first and second clamp segments threaded over at least portions of the lengths thereof and a third clamp segment integral with and extending between ends of said first and second clamp segments;

a plate defining spaced openings, ends of said first and second clamp segments remote from said third clamp segment projecting through said spaced openings;

nuts threadedly engaged with the ends of said first and second clamp segments projecting through said spaced openings connecting said clamp to said plate; and

an elongated stiffener member disposed between said plate and said third clamp segment for engaging a hanger rod extending parallel to said elongated stiffener member and cooperable with said clamp to maintain the hanger rod in a predetermined position relative to said elongated stiffener member and said clamp, at least a portion of said third clamp segment being straight and non-orthogonally disposed relative to said first and second clamp segments and cooperable with said elongated stiffener member to continuously exert lateral forces

on said hanger rod continuously urging said hanger rod to said predetermined position when the hanger rod is clamped between said clamp and said elongated stiffener member.

2. The stiffener apparatus according to Claim 1 wherein said third clamp segment includes interconnected first and second straight portions, said first straight portion extending from and forming an obtuse angle with said first clamp segment, said second straight portion extending from and forming an obtuse angle with said second clamp segment and said first and second straight portions defining an obtuse angle therebetween, said first and second straight portions exerting generally opposed lateral forces on the hanger rod continuously urging the hanger rod to the location of interconnection between the first and second straight portions when the hanger rod is clamped between said clamp and said elongated stiffener member.

3. The stiffener apparatus according to Claim 1 wherein said third clamp segment is substantially straight along the entire length thereof and forms an obtuse angle with said first clamp segment and an acute angle with said second clamp segment.

4. The stiffener apparatus according to Claim 2 wherein said first and second straight portions connect at a location substantially midway between said first and second clamp segments.

5. The stiffener apparatus according to Claim 2 wherein said first and second straight portions connect at a location closer to one of said first and second clamp segments than to the other of said first and second clamp segments.

6. The stiffener apparatus according to Claim 1 wherein said stiffener member comprises a channel bearing against said plate and the hanger rod.

7. The stiffener apparatus according to Claim 1 wherein said stiffener member has a circular-shaped outer peripheral bearing surface bearing against said plate and the hanger rod.

8. The stiffener apparatus according to Claim 1 wherein said stiffener member has a rectangular-shaped outer peripheral bearing surface bearing against said plate and the hanger rod.

9. The stiffener apparatus according to Claim 1 wherein said predetermined position is located at an intersection between said third clamp segment and one of the first and second clamp segments.

ABSTRACT OF THE DISCLOSURE

A hanger rod stiffener includes a clamp having two straight, double-ended, spaced, parallel clamp segments and a third clamp segment extending between them. The clamp is positioned over a stiffener member and a hanger rod and the third clamp segment is disposed at an angle to bias the hanger rod to a predetermined position within the clamp when the stiffener member and clamp are brought together.

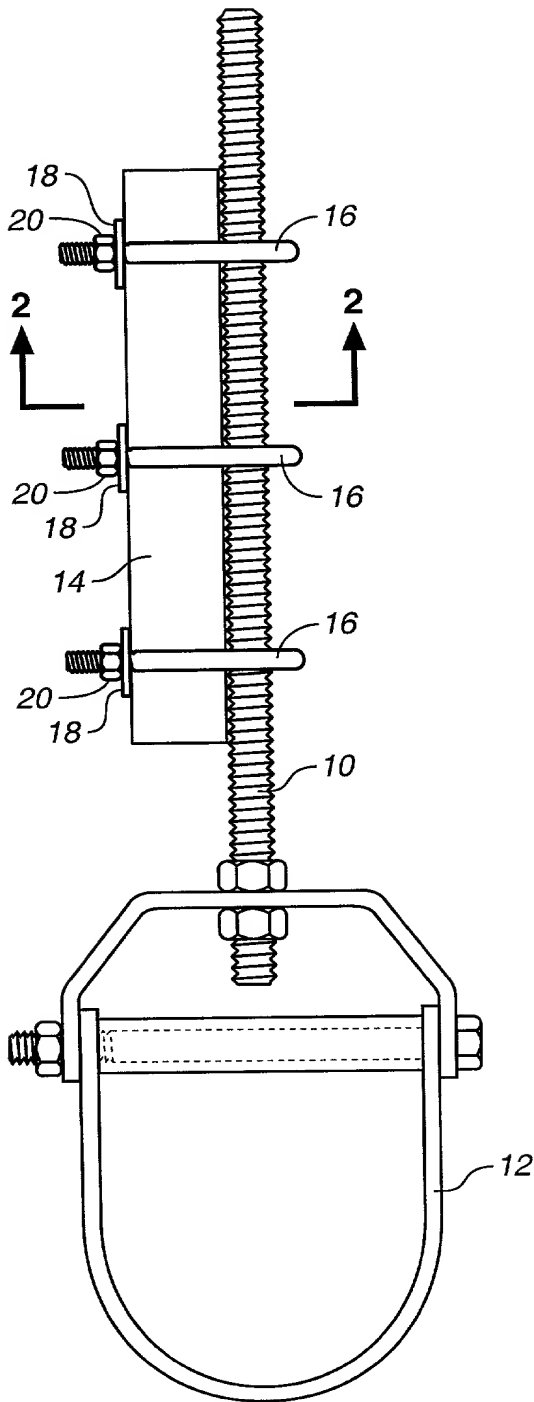


FIG. 1
(PRIOR ART)

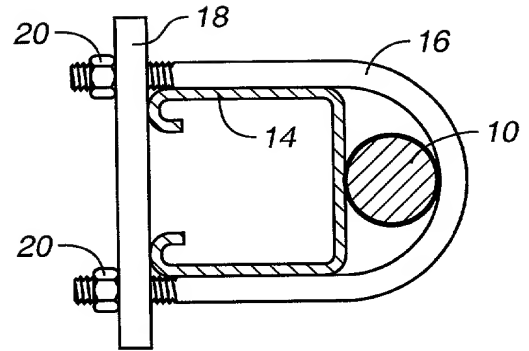


FIG. 2 (PRIOR ART)

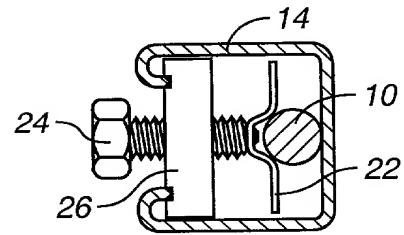


FIG. 3 (PRIOR ART)

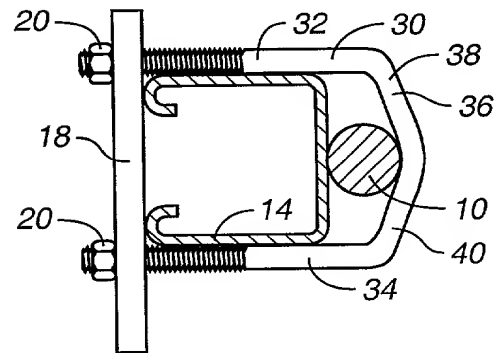


FIG. 4

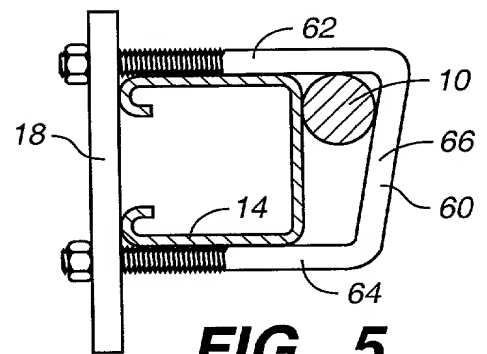


FIG. 5

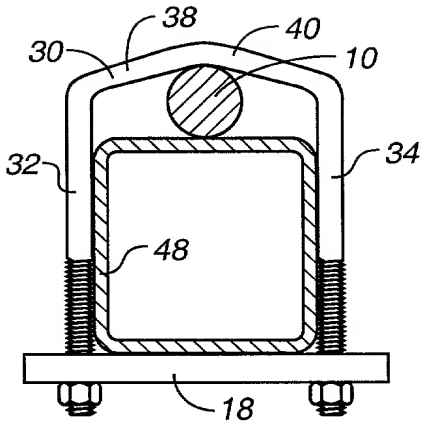


FIG._6A

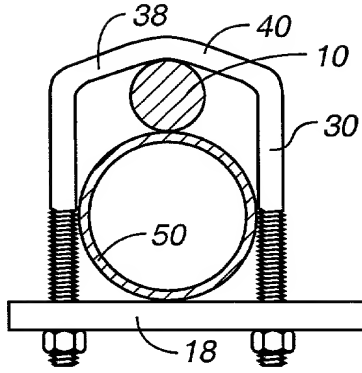


FIG._6B

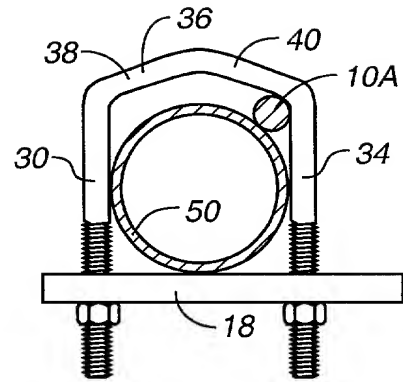


FIG._6C

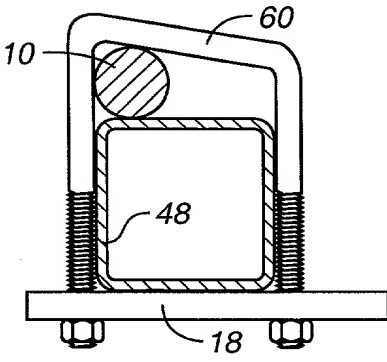


FIG._7A

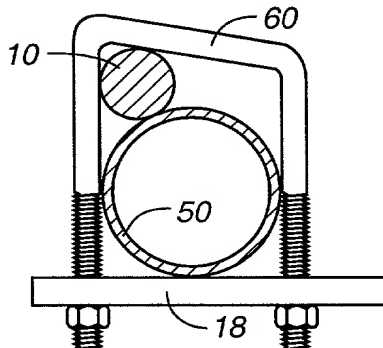


FIG._7B

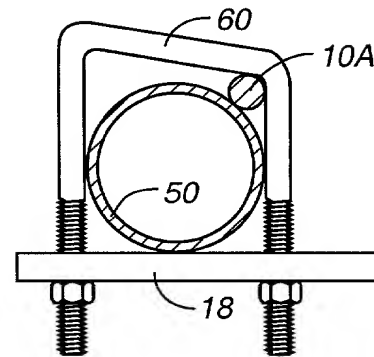


FIG._7C

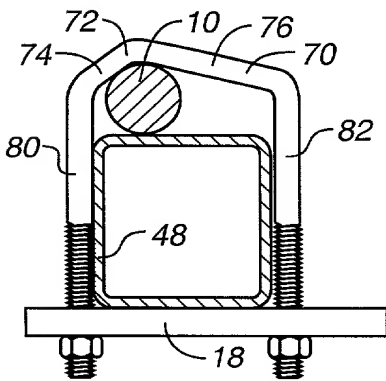


FIG._8A

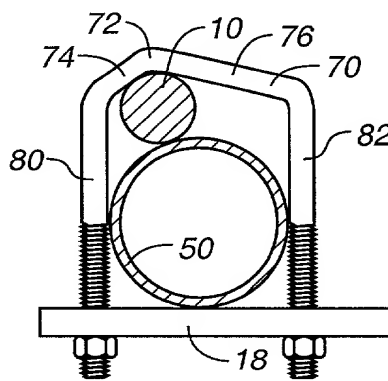


FIG._8B

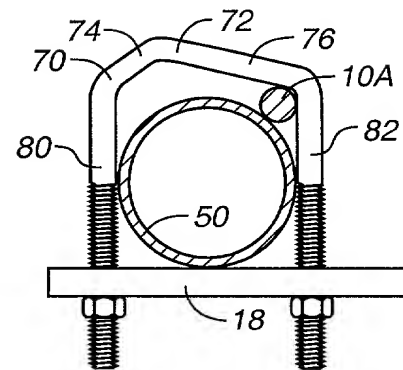


FIG._8C

COMBINED DECLARATION AND POWER OF ATTORNEY

IN ORIGINAL APPLICATION

Atty Dkt. No: ROTH #12

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated
below next to my name.

I believe I am the original, first and sole inventor (if
only one name is listed below) or an original, first joint
inventor (if plural names are listed below) of the subject matter
which is claimed and for which a patent is sought on the
invention entitled:

APPARATUS FOR STIFFENING A HANGER ROD

the specification of which ___ is enclosed herewith or X was
filed on _____ as Application Serial No. _____ and was
amended on _____ (if applicable).

I hereby state that I have reviewed and understand the
contents of the above identified specification, including the
claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is
material to the examination of this application in accordance
with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35,
United States Code, §119 of any foreign applications(s) for
patent or inventor's certificate listed below and have also
identified below any foreign application for patent or inventor's
certificate having a filing date before that of the application
on which priority is claimed.

Prior Foreign Applications(s):

COUNTRY _____ APPLICATION NUMBER _____
DATE OF FILING _____ PRIORITY CLAIMED UNDER
35 U.S.C.119 YES _____ NO _____

COUNTRY _____ APPLICATION NUMBER _____
DATE OF FILING _____ PRIORITY CLAIMED UNDER
35 U.S.C.119 YES _____ NO _____

I hereby claim the benefit under 35 U.S.C. §119(e) of any
United States provisional applications listed below.

APPLICATION SERIAL NO. _____ DATE OF FILING _____
STATUS: _____ PATENTED _____ PENDING _____ ABANDONED
APPLICATION SERIAL NO. _____ DATE OF FILING _____
STATUS: _____ PATENTED _____ PENDING _____ ABANDONED

I hereby claim the benefit under Title 35, United States
Code, §120 of any United States application(s) listed below and,
insofar as the subject matter of each of the claims of this
application is not disclosed in the prior United States
application in the manner provided by the first paragraph of
Title 35, United States Code, §112, I acknowledge the duty to
disclose material information as defined in Title 37 Code of
Federal Regulations, §1.56(a) which occurred between the filing
date of the prior application and the national or PCT
international filing date of this application:

APPLICATION SERIAL NO. _____ DATE OF FILING _____
STATUS: _____ PATENTED _____ PENDING _____ ABANDONED

APPLICATION SERIAL NO. _____ DATE OF FILING _____
STATUS: _____ PATENTED _____ PENDING _____ ABANDONED

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

THOMAS R. LAMPE, Registration No. 22,454

THEODORE J. BIELEN, JR., Registration No. 27,420

CHARLES L. THOEMING, Registration No. 43,951

Address all calls to: THOMAS R. LAMPE, Telephone No: 925/937-1515

Address all correspondence to:

THOMAS R. LAMPE

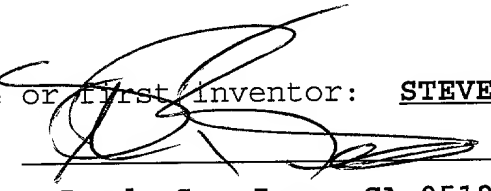
Bielen, Lampe & Thoeming

1990 N. California Blvd., Suite 720

Walnut Creek, CA 94596

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1. Full name of sole or first inventor: STEVEN A. ROTH

Inventor's signature: 

Date: 7/03/00

Residence: 3188 Mabury Road, San Jose, CA 95127

Citizenship: U.S.A.

Post Office Address: P.O. Box 0933

Alamo, CA 94507